Revised: December 2006

CAP CRM

Crew Resource Management

CAP Flight Ops

Outline

- Human Factors
- Why does CAP need CRM?
- What is CRM?
  - Situational Awareness
  - Communication
  - Checklists
  - Decision Making
  - Fatigue
- Applying CRM in the CAP Flight Environment
- CRM Training
- CRM Exercise

Human Factors

- NASA 1995 study revealed that:
- FOUR out of FIVE Pilot Errors that caused an ACCIDENT occur before the flight left the ground
- We tend to repeat the same AVOIDABLE mistakes OVER and OVER.
- WHY ????

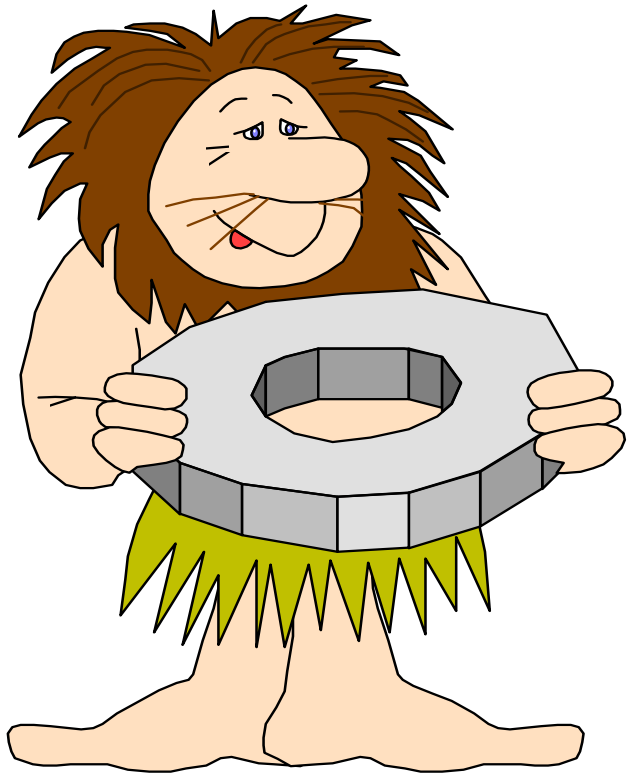
Human Factors
A Quick Lesson

- Every Action or Inaction we do in the air has a domino effect
- Why can the cause of an accident sometimes be traced back to something we did, or did not do before we ever walked out to the airplane

CRM Origin

- As Aviation Progressed, Hardware Became More Reliable
- Environment Became More Demanding
- Higher Demands Required Better Decision Making By Pilots
- The Human Factor Became The Weak Link

Why CRM in CAP ?



Why?

- CAP Accident record (1996 – Present)
  - 48 NTSB Reported Accidents
    - 5 non-powered
  - 11 Fatal Accidents, 22 Fatalities
- Unique Missions
  - Usually Irregular
    - Timing, Frequency, Type
  - Unusual Circumstances
    - Weather, Disaster Operations
- Crew Based Operations
  - Unfamiliar Crews

The Safety Equation

- Informed Decision Making is Relatively Easy
  - The more information you have to work with in the cockpit, the more intelligent, (and safe) will be the choice you make
- Safety = Pilot + Airplane + Passengers + Outside Resources

What is CRM ?

What is CRM?

YES

- Situational Awareness
- Judgment
- Expect Unexpected
- Attitude (Professional)
- Knowledge

NO

- Lack of Situational Awareness
- Complacency
- Poor Mindset
- Lack of Knowledge
- Bad Attitude
- Fatigue

CRM is a Tool for Error & Risk Management

Five Elements of CRM

- Inquiry
- Advocacy
- Conflict Resolution
- Decision Making
- Critique

Defining CRM

- Effective use of all available resources
- Broad resource categories
  - People
  - Machinery
  - Fuel/time
  - Information
- CRM is not limited to multi-pilot crews

Applying CRM to the Single Engine Pilot

- CRM Training can help reduce workload
- CRM Training helps in decision making process
- CRM Training enhances solo pilot operations
- CRM works for the professionals, why not CAP ?

CREW RESOURCE Management

- One Simple Premise: The effective management of a pilot's available resources.....
  - COCKPIT RESOURCE MANAGEMENT

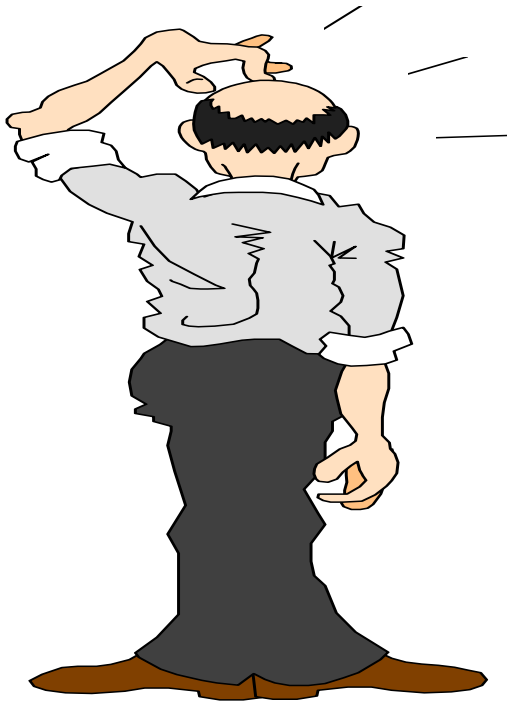
    becomes:
  - CREW RESOURCE MANAGEMENT
- Can You name some Resources ?

CAP Pilot Resources

- Yourself
- Weather Briefer
- FRO
- IC
- Other Crew Members
- ATC
- Checklists, etc..

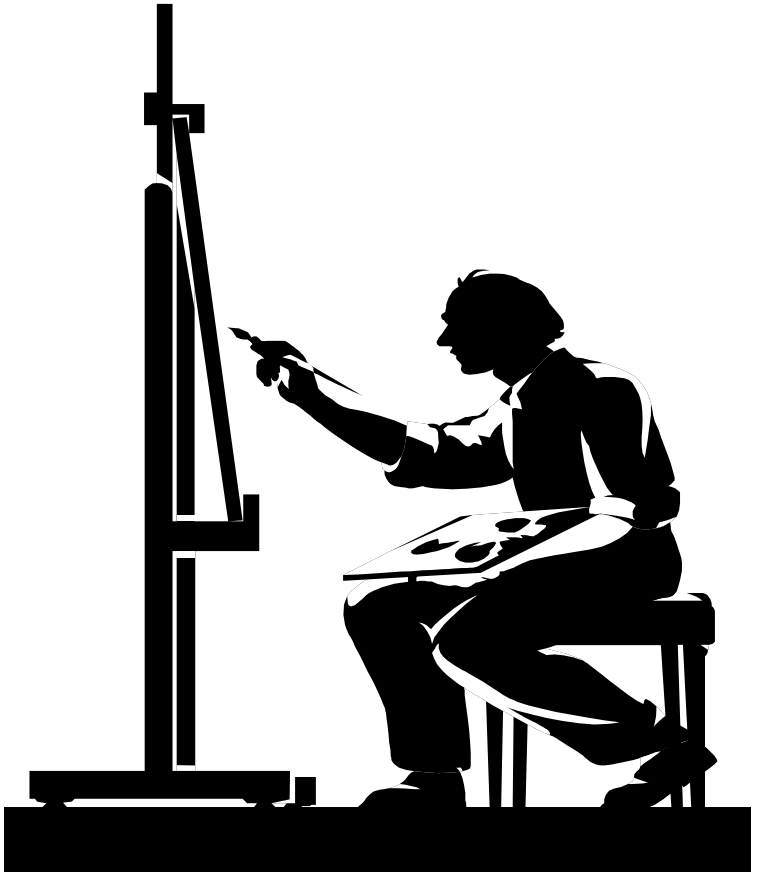
Situational Awareness and The Judgment Chain

- Situational Awareness = ??????????



SITUATIONAL AWARENESS

SEEING THE BIG PICTURE



Situational Awareness

- Knowledge of all pertinent aspects of your surroundings as it applies to the safe accomplishment of a task
- Elements of Situational Awareness
  - Weather, Aircraft Condition and Capabilities
  - Mission Goals or Objectives
  - Airspace, Terrain, Traffic
  - Crew Tasking

Elements of Situational Awareness

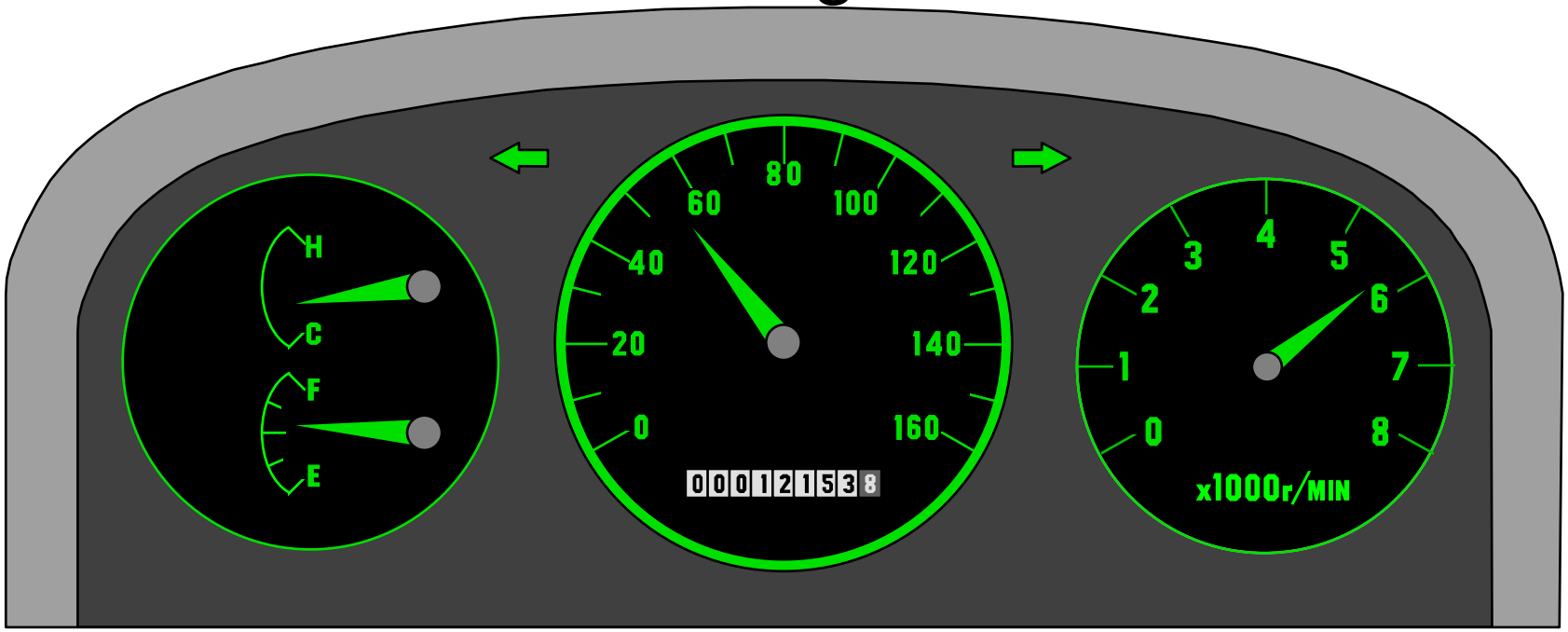
- Theory of the Situation - A set of beliefs about what is happening and what action the individual should take
  - Based on the interpretation of available information
  - It is the human's perception of reality
- Reality of the Situation - Actual reality, without human perceptions
- Theory of Practice - A person's concepts and skills developed over time and used to build and respond to "Theory of the Situation"
  - It is the sum of experience

Losing Situational Awareness

- True situational awareness is an individual's accurate perception of reality
- If a discrepancy exists between the individual's "Theory of the Situation" and the "Reality of the Situation", a loss of situational awareness occurs and an error chain could begin

Risk Factors

- All human undertakings entail RISK



Evaluating Risk in the Flight Environment

- The Plane- Type, Equipment, Etc.
- The Pilot- FAA I'M SAFE Model
  - Illness, Medication, Stress, Alcohol, Fatigue, Experience
- The Environment- IFR,VFR, Mountains,
- The Situation- Day, Night, AC Maint, Etc..

High Risk Situations

- Taking Off with Known Problem
- Midair Collision- High Density Area
- Inadequate Terrain Separation- CFIT
- Unstabilized Approach
- Deviation From SOP
- Weather
- COMPLACENCY

F.S.I. 11 clues to your level of Situational Awareness

1. Failure to meet targets
2. Use of undocumented procedures
3. Departure from SOPs
4. Violating minimums or limitations
5. No one flying airplane
6. No one looking out the window
7. Communications breakdown

Flt Safety Clues (cont.)

8. Ambiguity
9. Unresolved discrepancies
10. Preoccupation or distraction
11. “BAD FEELING”

Clues to Loss of Situational Awareness

- Low Stress Level
  - Lack of alertness
  - Loss of recognition of warning signals
  - Reduced ability to quickly & correctly
- High Stress Level
  - Low levels of situational awareness
  - Information overload
- Ambiguity
  - Information can be interpreted in more than one way
- Confusion or Unresolved Discrepancies
  - Unclear information or does not agree

Clues to Loss of Situational Awareness

- Fixation or Preoccupation
  - Ability to detect other important information lost
- Departures from SOPS/Regulations
  - Violating minimums
  - Using improper procedures
- Failure to Meet Planned Targets
  - When planned targets are not met such as airspeeds, checkpoints, times, etc
  - Must question why
- Gut Feeling
  - Our bodies are able to detect stimuli long before we have consciously recognized the them - trust your feelings

Maintaining Situational Awareness

- Experience
  - Creates a mental file
  - Experience file helps establish how one interprets & responds to conditions
- Training
  - Adds to pilots experience file
  - Can experience situations in training that occur rarely
- Spatial Orientation
  - Position awareness
- Physical Flying Skills
  - Must be more than a cockpit manager in an automated cockpit

Maintaining Situational Awareness

- Ability to Process Information
  - use of information from sense inputs, instruments, and other sources to form an accurate picture of what is happening
- Cockpit Management Skills
  - contribute to the ability to manage the total flight environment
- Personal Attitude
  - professionalism
  - To be safe, one must think safe
- Emotional/Physical Conditions
  - affects ones perception of the environment
  - emotional/physical problems can cloud or distort an accurate perception of events or conditions

Communication

Communication is BOTH Transmit AND Receive

Communication Factors

- Bias / Prejudice
- Relationship
- Choice of words
- Perceptions
- Preoccupation
- Intimidation
- Body Language
- Habits
- Motivation
- Attitude
- Education
- Background
- Assumptions
- Fear
- Mind Sets
- Ego
- Voice Tone
- Inflection
- Clarity

Communication

- Modes of communication
  - Verbal (7%)
  - Non-Verbal (38%)
  - Symbolic (55%)
- Communication Process (Four elements)
  - Sender
  - Message
  - Receiver
  - Feedback

Essential Verbal Communication Skills

- Inquiry
- Advocacy
- Listening
- Conflict Resolution
- Critique

How to Communicate

- Questions to Consider
  - “What do they know that I need to know?”
  - “What do I know that they need to know?”
  - “What do none of us know that we need to know?”
- State Position
- Suggest Solution
- Be Persistent
- Timely
- Listen Carefully
- Keep an Open Mind
- Use a Predetermined “Key Phrase” To Express Non-Confrontational Discomfort With Any Situation

Barriers to Communication

- Personality Issues
  - Personality Types
    - Macho, Resignation, Anti-Authority, etc.
    - Use Antidotes (see FAA CFI)
- Intimidation
  - Position
    - Commanders, Check Pilots, Rank
  - Mission Client Pressure
  - Pilot vs. Non-Pilot Crew

Pilot Personalities

- The MACHO Pilot
- The Impulsive Pilot
- The Invulnerable Pilot
- The “Antiauthority” Pilot
- The Resigned Pilot

Attitude Vs Antidote

1. Antiauthority: Don't Tell Me!
2. Impulsivity: Do something quickly
3. Macho
4. Resignation: What's the Use?
5. Invulnerability: It won't happen to me!

1. Follow the Rules, They are usually Right
2. Not so fast, Think First
3. Taking Chances is foolish
4. I'm not helpless, I can make a difference
5. It could happen to me...

Behavioral Styles

- Aggressive
  - High task oriented & low relationship oriented
  - First consideration to the task or goal
- Relationship Oriented
  - First consideration to the feeling of others
  - Caring or nurturing style of behavior
- Combinations
  - Low relationship & low task oriented traits
  - Considered to be loners or autonomous in behavior

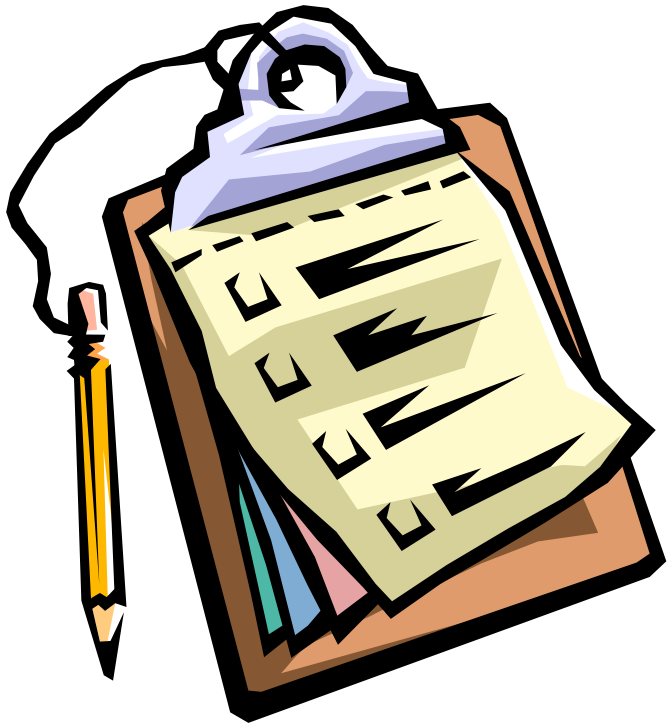
Assertive Behavior

- Intended to be the middle ground
- Best of aggressiveness (without the put-down negatives)
- Best of non-assertiveness (without loss-of-self)
- Conviction that one's position can be expressed strongly without dominating the other

In the Cockpit

- As a crew member, you have the right to assure that your life will not be compromised by any action/inaction, miscommunication, or misunderstanding
- Assertive behavior in the cockpit does not challenge authority; it clarifies position, understanding or intent, and as a result enhances the safe operation of the flight

Checklists



Standard Operating Procedures (SOP)

- Standard Phraseology
- Standard Call-outs
- Checklists
- Crew Briefings

Checklists

- They do not fly the airplane, Pilots do
- Memory will FAIL often
- Clear and concise
- Command and Response
  - Response Must Match for Normal
  - Response Checked for Abnormal and Emergency
- BOLD FACE items must be memorized

Decisions, Decisions, Decisions

Can you name this Mission Pilot, IC, Ground Team Leader?

DECIDE

- Detect the need to make a decision
- Evaluate you options, considering the goals of your flight
- Choose the options that best meet your goals
- Implement that choice
- Detect the changes that result from your decision
- Evaluate the result and your need to make further decisions

Human Problem Solving

- Humans Solve Problems Three Different Ways
  - Skills-based actions
    - Accomplished will little effort
    - Dependant on mastery of basic skills
  - Rules-based actions
    - Well prescribed procedures
    - Crew reaction to an emergency situation
  - Knowledge-based actions
    - Ambiguous situation
    - No clearly proscribed procedures
    - Offers a variety of options

Decision Making

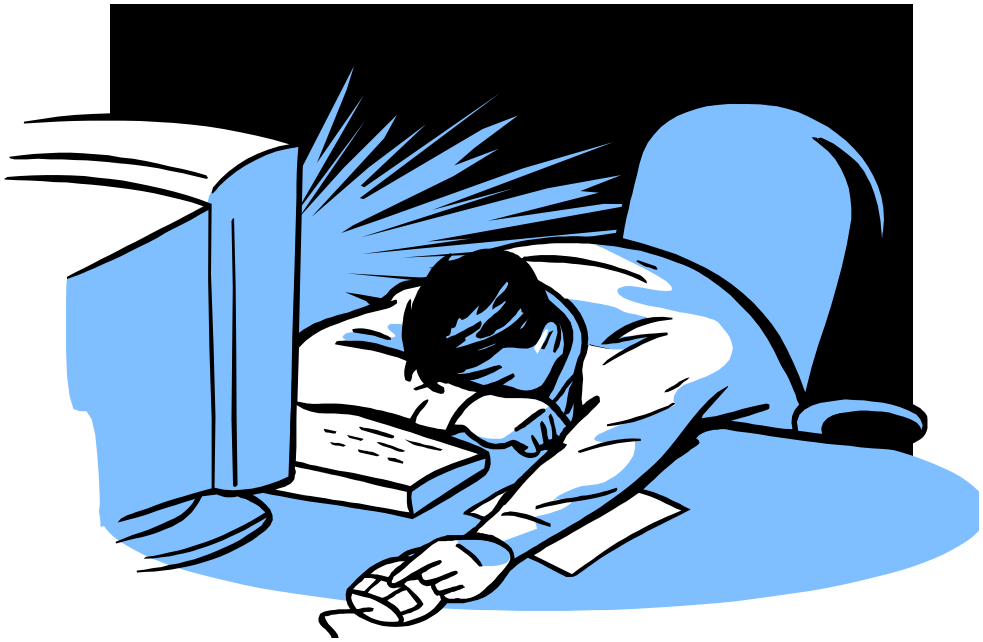
- Begins with Good Situational Awareness
- Evaluate Situation
  - What needs to be corrected?
  - What resources do you have?
  - How can the resources be best used?
- Consider consequences of possible actions
- Make decision, inform all involved
- Evaluate decision, repeat as needed

You make the wrong decision once, you make the right decision forever

Factors Affecting Decision Making Capability

- Fatigue
- Stress
- Medication and Health
- Alcohol
- Personality

Fatigue



Bad enough on the ground…but in the air???

Types of Fatigue

- Physical
  - Lack of Sleep
  - Lack of Oxygen
  - Difficulty of Task
  - Physical Fitness
- Mental
  - Stress
  - Anxiety (5 phases)
  - General Psychological State (e.g. Mood)

Fatigue Effects

- Fatigued pilots are:
  - Less vigilant
  - More willing to accept below par performance
  - Show signs of poor judgement
- Worst danger
  - Apathy
  - Indifferent as to the outcome of the flight & their performance

Causes of Fatigue

- Disturbance of circadian rhythms
- Continuous wakefulness
- Cumulative sleep loss
  - Loss of as little as one hour sleep begins a person's sleep debt
  - Eight hours of disturbed sleep can produce effect of too little sleep
  - Only cure for sleep debt is to sleep

Fatigue Inducers

- Length of duty day
- Restricted time available for sleep
- Quality of sleep
- Stressors such as noise, vibration, flicker, heat/cold, wearing headsets
- Poor diet
- Vision fatigue - loss of effective eye function from prolonged visual exertion
- Dehydration
- Unresolved stress

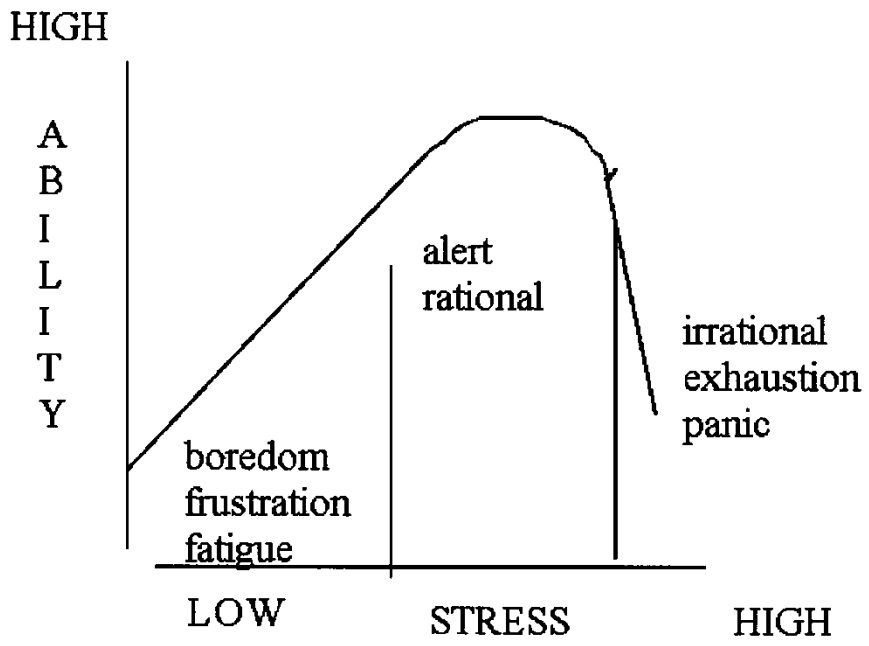
Stress Management

- In human terms, stress is used to describe the body's response to demands placed on it
- Three types of stress
  - Physical - environmental conditions, noise, vibration, stages of hypoxia
  - Physiological - fatigue, lack of physical fitness, improper eating
  - Emotional - social & emotional factors related to living and intellectual activities

Stress Management

- Stress is cumulative
- Two categories of stress
  - Chronic stress - result of long term demands if lifestyle or personal situations
    - More dangerous of the two
    - Can threaten health
  - Acute stress - result of demands placed on body by a current issue/problem

Effect of Stress on Ability



Conclusion: CRM is All About Attitude!

The greatest discovery of mankind is that human beings can alter their lives by altering their attitudes

Leadership

- No matter what position you occupy in the crew you must learn to become a leader in that position
- What makes a leader?
  - Leader is a person whose ideas and actions influence the thought and behavior of others
  - Accomplished through the use of examples, persuasion, and an under standing of the goals and desires of the group

Leadership Skills

- Regulating the information flow
  - Includes using and accepting non-confrontational “key phrases” and gradually escalated action if required
    - “I’m uncomfortable” or “Knock it off”
- Directing and coordinating crew activities
- Motivating crew members
- Decision making

CRM Skills

- Manage (use) resources
- Ask the right questions - Inquiry
- State your opinion - Advocacy
- Resolve differences - Conflict Resolution
- Make Decisions
- Evaluate Constructively - Critique

Professionalism

- The conduct, aim or qualities that characterize or mark a profession or a professional person
- Professionalism is achieved only after extended training and preparation and is based on study and research
  - Requires the ability to reason logically, accurately, and make good judgmental decisions
  - Cannot limit their decisions to standard patterns and practice

Bottom Line

- The mission pilot, observer, and scanner for a CREW, not three individuals with separate and unrelated duties and interests
- The importance of CRM is to get the individual crew members to work together to achieve the objectives of the mission in a safe manner

In the end…

it is the attention to detail

that makes the difference

It is the center-fielder's

extra two steps to the left

the salesman's memory for names

the lovers phone call,

the soldier's clean weapon

It is the thing that separates

the winners from the losers,

the men from the boys, and very often

the living from the dead.

Applying CRM in the CAP Flight Environment

Fly Like The “PROS”

- Remember, that you, the pilot are solely and ultimately responsible for the SAFE outcome of the flight

- THERE IS NO REASON the CIVIL AIR PATROL CAN’T BE AS SAFE AS THE PROS. WE MUST BE THE PROS IN OUR TYPE OF FLYING

Required Management Skills

- Use of checklists, SOPs
- Flight Planning and progress monitoring
- Management of resources
- Judgement and decision making
- Communication
- Managing people
- Stress management
- Workload assessment and time management
- Recognition and management of distractions

Crew Briefing

- Fly the mission the way we were briefed
- Fly the mission by the rules
- If you see anything that you do not like or are uncomfortable with, do not hesitate to bring it to my attention
  - “I’m uncomfortable” is a possible key phrase
  - Brief one warning, then escalate action if needed
- “Sterile cockpit” procedure

CAP Situational Awareness

- Low Altitude Search Awareness
  - Steel Cornstalks
  - Mountain Effects
- Traffic
  - Scud running
  - Traffic Patterns within Search Pattern
  - “Other helpers”
- Mission Specific Information
  - Goals, Target Information, etc.

CAP Specific Communications

- External
  - ATC Radios
  - CG/CAP Radios
  - SATCOM
- Internal
  - Observer, Scanner
- Crew Coordination
  - Inter-Crew and Extra-Crew

CAP Specific Checklists

- Mission Specific Checklists
  - Tasking for Observers and Scanners
- Similar but Different Aircraft
  - CAP Specific Equipment
    - DF Gear, FM Radio, SATCOM
    - FM Marine Band Radio
  - Fuel Injected vs. Carbureted

CAP Specific Decision Making

- Operational Risk Management Tools
- Incident Command Structure

CAP Specific Fatigue

- Sense of Urgency
  - Perceived Mission Need
  - “Pop up” Missions

Other Thoughts & Ideas

- Focus attention on details while keeping the big picture
- Anticipate, stay ahead of the situation
- Consider contingencies and have alternate plans of action ready
- Assign clear roles and responsibilities
- Plan for handling distractions
- Utilize all available resources
- Use Reminders

CAP Specific Summary

- CAP Missions have all of the risk of normal flights plus more
- CRM can benefit CAP in managing this risk
- Elements of CRM apply directly to CAP
  - Situational Awareness, Communications, Checklists, Decision Making, Fatigue

CRM Training

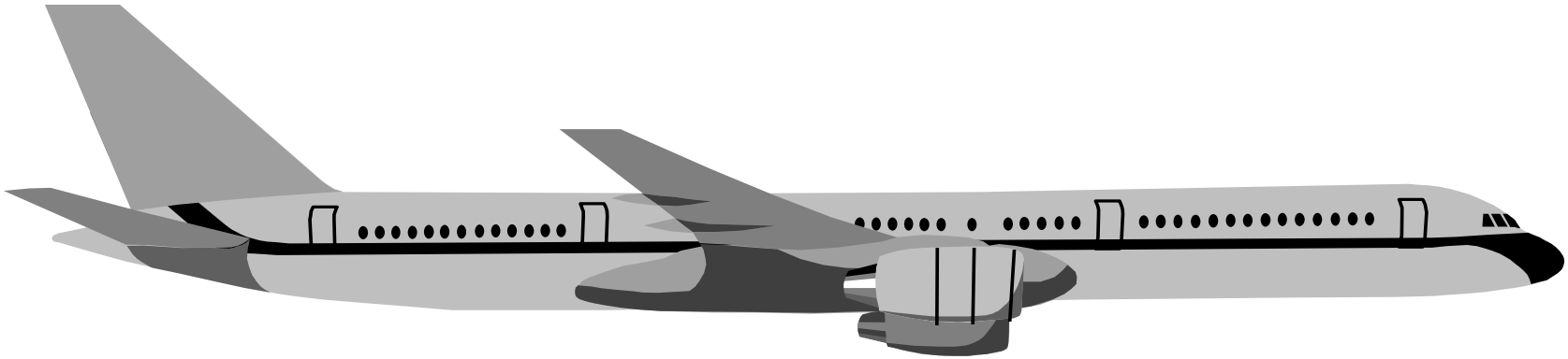
CRM Training

- Six major areas
  - Communication/Interpersonal skills
  - Situational Awareness
  - Problem-solving/Decision-making/Judgement
  - Leadership/”followership”
  - Stress Management
  - Critique

Teaching Cockpit Management (CRM)

- Know Your Check Pilots
- Incorporate CRM in Training Syllabus
- Have CRM “Safety Down Day”
- Other Ideas???

Airline Safety Improved with CRM Introduction



Airlines Use Line Oriented Flight Training (LOFT)

- Analysis of airline accidents over 20 years show approximately 70% were a direct result of inadequacies related to aircrew coordination, workload management, and decision making
- Concept of CRM was developed to address the deficiencies of human behavior in the cockpit
- LOFT introduced to allow flight crews to combine their technical proficiency and CRM theory into practical skill in simulator scenarios

Malfunctions in the LOFT Environment

- **Type A**
  - Critical emergencies
  - “By the book” responses (skills or rules-based actions)
- **Type B**
  - Relatively minor or abnormal malfunctions
  - Resolution procedure less defined
  - Knowledge-based actions and CRM principles to properly assess & resolve

LOFT Event Sets

- A LOFT scenario comprises a staged event set (group of related events inserted for specific CRM & technical training objectives)
- Event set made up of one or more events, including:
  - Event trigger (example, landing gear malfunction
  - Distracters (course change)
  - Supporting events (other events, such as, ILS off at destination)

Future Tasks

- CRM Guide for Flight Crew Members
  - Explanation of “Sterile Cockpit”
  - Traffic Pattern Procedures
  - ATC communications

CRM Exercises

Audience gets to critique the players after each exercise

Scenario #1

- Mission: Post Hurricane Damage Assessment along east coast from Daytona Beach to Key West
- WX: VFR
- Conduct Crew Safety Briefing at/in aircraft prior to engine start
- Include Overwater Briefing

Scenario #2

- While on CD Overwater Mission (Single Engine) the aircraft engine develops a roughness
- Aircraft is 20 NM east of MTH
- WX: VFR
- Determine Options Available.

Scenario #3

- While on a SAR Mission, Wx starts to deteriorate. Thunderstorms develop between Mission Base and the Aircraft position
- A/C is 45 miles east of Base (LAL)
- Pilot is IFR rated/ and CAP current
- Determine Options

Scenario #4

- Mission: ELT Night- Wx: VFR
- PIC is IFR Rated and Current
- Rated Observer is also a Student Pilot with 30 hours flight time
- PIC becomes ILL(Food Poisoning)
- A/C is 20 miles east of RSW

Scenario #5

- While on Routine Coastal Patrol (Sundown), the aircraft has a total engine failure. A/C is beyond gliding distance of land. All Crew members (3) are wearing PFD's and there is a life raft aboard.
- Give safety briefing prior to departure of mission.
- Give crew briefing prior to ditching

Scenario #6

- While on a SAR mission (annual evaluation) you are contacted to track down an ELT signal associated with an overdue aircraft
- While enroute to the mission area, one of your two observers becomes violent ill, throwing up and complaining of chest pains
- What are your actions?

Scenario #7

- Report of missing aircraft PA-28RT, N0357CC, White and Blue, PIC: Jones, Harry L., Colonel, CAP, age 52, past Ohio Wing Commander, Passenger: Jones, Linda K., age 50.
- Aircraft was on flight from Dayton Wright Brothers to Kelly's Island airport. Weather forecast clear with visibility 3 SM , Haze. Aircraft departed MGY 1038Z, ETA 1215Z Reported overdue at 1300Z by Cleveland FSS.
- AFOCC initiated mission at 1235Z based upon ELT active near 41degrees 45 minutes North, 83 degrees, 30 minutes West.
- Incident Commander assigned is brother-in-law of Mrs. Jones. Crew from CAK is: PIC 2500 hour MP is active CFI with 10 years in CAP, MO is instrument pilot with 3 years in CAP, MS is 22 year old with 6 months in CAP. MP and MO have known missing pilot for all of their time in CAP.
-
- Upon arrival at SKY VOR at 6000 feet the ELT is loud and clear and indicates north of aircraft. Weather is clear and 2 SM in haze over Lake Erie. A female voice transmission heard on 121.50 asking for help. The CAP Aircraft arrives over Kelly's Island and the ELT still indicated north of aircraft. The female voice on 121.50 indicates a foggy crash on an island airport with pilot unconscious.
- CAP crew contacts IC for instructions:
- What information should be relayed to the IC?
- What should be the immediate action of the crew?
- IC suggests tracking to ELT and landing to render assistance:
- MO points out that next island north is in Canadian Airspace.
-
- What is the next decision and action for the MP?
- What should be relayed to the IC?

Scenario # 8
Communication Conflicts

- Crew:
  - PIC:
    - 25 Year BIG Airline, 2 Year CAP
    - 18,000 Hrs Total, 55 Hrs 182
  - OBS:
    - 14 Year CAP, Master Rating
    - 4 Finds, 8 Saves
  - SCN:
    - Newly Qualified, 4 Sari's, 0 REDCAP’s

Communication Conflicts

- Situation:
  - REDCAP
    - 4th of July Weekend
    - ELT in Mountainous Terrain heard by high flyers
    - PA22 reported overdue on flight plan
    - Mission Base being formed
    - Telephonic Release

Communication Conflicts

- What Barriers to Communication exist?
- Perform a Crew Mission Briefing
  - Explain emphasis items for safety
  - Any additional questions need to be addressed by Mission Base